

REMARKS

Entry of the foregoing amendments after final rejection as narrowing the issues and presenting the claims in better condition for appeal is respectfully solicited. The foregoing amendments after final rejection have not been earlier presented because of the comments raised in the official action's Response to Arguments.

Claims 1-6, 8-11, 19-22 are pending and at issue in the application with claims 1, 19, 20 and 21 being independent claims. Claim 1 has been amended. Claims 21 and 22 have been added. As a result, 4 independent claims now exist in the application as compare to the 3 independent claims previously paid for, and 14 total claims remain in the application as previously paid for. This response is being filed with the fee of \$200 to cover the additional independent claim. The applicants believe no additional fee is due. However, the Commissioner is hereby authorized to charge any deficiency in the amount enclosed or any additional fees which may be required under 37 CFR 1.16 or 1.17 to Deposit Account No. 13-2855. Reconsideration and withdrawal of the rejections in view of the remarks below is respectfully requested.

The applicants respectfully traverse the rejection of claims 1, 2, 4, 10, 11, 19 and 20 as unpatentable over Hamzehdoost et al. (U.S. Patent No. 5,430,331) in view of Ohno et al. (U.S. Patent No. 5,227,662). The applicants further respectfully traverse the rejections of claims 3, 5, 6, 8, 9, 11, 19 and 20 as unpatentable over Hamzehdoost et al. in view of Ohno et al. and further in view of one or more of Majumdar et al. (U.S. Patent No. 5,703,399), McCarthy et al. (U.S. Patent No. 3,956,726), Tomita et al. (U.S. Patent No. No. 5,440,169) and Ikeda et al. (U.S. Patent No. 5,635,751).

Each of claims 1-6, 8-11, 19, 20 and 22 recites a semiconductor power module that includes a heat sink having an electrically insulating property and thermal conductivity, and that directly contacts the lead frame and has a surface exposed to the outside of the semiconductor power module. New claim 21 recites a semiconductor power module that includes a thermally conductive electrical insulator. The heat sink or electrical insulator of each of claims 1-6, 8-11, and 19-21 has a surface exposed to the outside of the semiconductor power module. Support for new claim 21 may be found throughout the applicants' specification as originally filed. (See e.g., page 3, line 22 through page 4, line 7; page 5, line 10 through page 6, line 6).

It is apparent from reviewing the Response to Arguments on pages 11 and 12 of the action, that the applicants' remarks in the previous response have been misunderstood and/or not fully considered. None of claims 1-6, 8-11, or 19-22 is obvious over Hamzehdoost et al. in view of Ohno et al. The action does not make out a *prima facie* case of obviousness. In particular, the motivation to combine the references as asserted in the action is improper. Further, one of ordinary skill in the art would not be motivated to combine the references, because Ohno et al. teaches away from the claimed combinations and teaches away from the disclosure of Hamzehdoost et al. Ohno et al. also demonstrates that there is no reasonable expectation of success in the claimed combinations.

In particular, as established in the applicants' previous response, Ohno et al. does not motivate one of ordinary skill the art to provide a heat sink having an exposed surface and directly contacting a lead frame based on the rationale of good heat dissipation, because Ohno et al. does not associate good heat dissipation with an exposed heat sink. Instead, Ohno et al. only discloses good heat dissipation through the whole package, and specifically through the lead frame 32, but not through an exposed heat sink. (See column 4, lines 43-53). Even then, Ohno et al. only discloses good heat dissipation as associated with a package that has no heat sink. (See Figs. 3A-4 which correspond to column 4, lines 43-53). As such, it is impossible for Ohno et al. to provide the motivation as asserted in the action, because Ohno et al. does not associate good heat dissipation with exposing the surface of the heat sink. While the action cites the cover figure of Ohno et al., the cover figure merely discloses exposing a surface of a heat sink 40 that is electrically insulated from the lead frame 10 by an adhesive bond 16 and plastic film 22, 22', and the action has not cited any particular portion of Ohno et al. which discloses that exposing the surface of the heat sink provides good heat dissipation.

To the extent the action relies upon Ohno et al. as providing a motivation to combine the references, it is not sufficient to merely refer to any advantage cited in a reference as a motivation to combine, particularly where the advantage is not associated with the teachings being relied upon in the action. Obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion or motivation to do so. See *In re Kahn*, 441 F.3d 977, 986, 78 USPQ2d

1329, 1335 (Fed. Cir. 2006) (Emphasis added); see also MPEP 2143.01. In other words, the motivation is not merely to consider both of the references, but to take the teachings of the references to produce the invention as claimed. If the asserted motivation is associated with teachings different from those relied upon in the action, and which do not produce the claimed invention, then the asserted motivation is improper. Nonetheless, even if an exposed heat sink is associated with good heat dissipation, the disclosure of Ohno et al. specifically teaches away from the combination of an exposed heat sink that directly contacts a lead frame, as explained further below.

If the action is not relying upon Ohno et al. as disclosing the asserted motivation, then the source of the rationale to modify or combine Hamzehdoost et al. and Ohno et al. is unclear. To the extent the action relies upon common knowledge in the art or “well known” prior art as the motivation to combine Hamzehdoost et al. and Ohno et al., the action has not produced any authority demonstrating that the art recognizes the suitability of the claimed combinations (e.g., exposing a surface of the heat sink in direct contact with a lead frame). Indeed, it is never appropriate to rely solely on “common knowledge” in the art without evidentiary support in the record, as the principal evidence upon which a rejection is based. See *In re Zurko*, 258 F.3d 1379, 1385, 59 USPQ2d 1693, 1697 (Fed. Cir. 2001); see also MPEP 2144.03 (A). Accordingly, if exposing a surface of the heat sink that directly contacts a surface of a lead frame is a well known process for providing good heat dissipation and is within the knowledge generally available to one of ordinary skill in the art, the applicants respectfully request production of authority supporting such a statement. See MPEP 2144.03 (C).

Without identifying a source for the asserted motivation to combine Hamzehdoost et al. and Ohno et al. as required by MPEP 2143, the applicants can only assume that the asserted motivation has been derived from the applicants’ disclosure. Indeed, only the applicants’ disclosure has identified the advantage of improved heat dissipation using an exposed heat sink that directly contacts a lead frame. (See e.g., page 8, lines 5-9). However, as noted in the applicants’ previous response, basing the suggestion or motivation to combine on the applicants’ disclosure is not a proper basis for asserting a suggestion or motivation to combine. It is clear that to establish a *prima facie* case of obviousness, the teaching or suggestion to make the claimed combination and the reasonable expectation for success must both be found in the prior art, not in an applicant’s disclosure. See MPEP 2143.

The action further misunderstands the applicants' argument regarding Ohno et al. teaching away from the claims and teaching away from Hamzehdoost et al. The action asserts that "the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference." (See action, page 11). However, this assertion relates to arguments regarding physically combining the devices of the references. See MPEP 2145 (III). The applicants did not argue that the devices of Hamzehdoost et al. and Ohno et al. are not physically combinable. Instead, the applicants stated, and maintain, that Ohno et al. teaches away from the claims and teaches away from the disclosure of Hamzehdoost et al. See MPEP 2141.02 and MPEP 2145 (X)(D). Ohno et al. specifically discloses an insulating adhesive tape or insulating bonding means 16 and a plastic film 22, 22' separating a heat sink from a lead frame and providing electrical insulation. (See column 2, lines 60-62; column 3, lines 28-47; Figs. 4, 6 and 7). The fact that Ohno et al. requires electrical insulation between a heat sink and a lead frame explicitly demonstrates that Ohno et al. teaches away from a heat sink directly contacting a lead frame. This disclosure cannot be ignored. See MPEP 2141.02 (prior art must be considered in its entirety, including disclosures that teach away from the claims). As a consequence, there can be no motivation to combine Ohno et al. with Hamzehdoost et al. to provide exposing a surface of a heat sink that directly contacts a lead frame when Ohno et al. explicitly teaches away from direct contact with the lead frame by providing an intervening electrically insulating adhesive 16 and plastic films 22, 22'.

The applicants have further demonstrated that there can be no reasonable expectation of success based on the disclosure of Ohno et al. The action does not appear to address this argument. As the applicants established in the previous response, Ohno et al. specifically discloses an insulating adhesive 16 and plastic film 22, 22' separating a heat sink 40 from a lead frame and providing electrical insulation. As a consequence, Ohno et al. demonstrates there was no reasonable expectation of success in having a heat sink in direct contact with a lead frame. It is clear that a *prima facie* case of obviousness cannot be maintained where the prior art shows there is no reasonable expectation of success. See MPEP 2143.02.

Accordingly, it is clear that while Hamzehdoost et al. discloses the lead frame having first and the second portions with different heights and the heat sink made of AlN, Hamzehdoost et al. does not disclose that the heat sink possesses both thermal conductivity and electrically insulating property, and does not disclose that a surface of the heat sink is

exposed to the outside, as acknowledged in the action. It is further clear that while Ohno et al. discloses a lead frame 28, and a heat sink 40 exposed to the outside, Ohno et al. also discloses an intervening adhesive bond 16 and plastic film 22, 22' for electrical insulation and therefore does not disclose or suggest a heat sink the directly contacts the lead fame 28. As established above, there is no motivation to combine the references, whether in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). Absent a proper motivation to combine Hamzehdoost et al. and Ohno et al. to produce the claimed semiconductor power module, any conclusion of obviousness is necessarily based on an impermissible hindsight combination of the references. See MPEP 2141.01, 2145 (X)(I).

For the foregoing reasons, reconsideration and withdrawal of the rejections of the claims and allowance thereof are respectfully requested. Should the examiner wish to discuss the foregoing, or any matter of form, in an effort to advance this application towards allowance, the examiner is urged to telephone the undersigned at the indicated number.

Respectfully submitted,

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